

We claim:

1. ~~An isolated nucleic acid, which encodes the C₁ bacteriophage of Streptococcus.C.~~
2. The isolated nucleic acid of claim 1, wherein the nucleic acid comprises the sequence of SEQ ID NO: 21, and includes recombinant DNA molecules, cloned genes, degenerate variants, mutants, analogs, or hybridizable fragments thereof.
3. An isolated polypeptide, comprising an amino acid sequence of a C₁ bacteriophage PlyC lytic enzyme.
4. The isolated polypeptide of claim 3, wherein the polypeptide comprises at least two subunits, said subunits comprising a PlyC lysin light chain (PlyC-B) and a PlyC lysin heavy chain (PlyC-A).
5. The polypeptide of claim 3, wherein the polypeptide comprises the amino acid sequences of SEQ ID NOs: 9 and 11.
6. The polypeptide of either of claims 4 or 5, wherein said polypeptide comprises multiple copies of one or both subunits and fragments, mutants, variants, analogs or derivatives thereof.
7. The polypeptide of claim 5, wherein the polypeptide further comprises the amino acid sequence of SEQ ID NO: 10.
8. An isolated nucleic acid, which encodes the PlyC multimer.
9. The isolated nucleic acid of claim 8, wherein the nucleic acid comprises the sequence of SEQ ID NOs: 22 and 23, or SEQ ID NO: 25 and includes recombinant DNA molecules, cloned genes, degenerate variants, mutants, analogs, or hybridizable fragments thereof.

10. A method for treating or preventing bacterial infections, comprising administering a therapeutically effective amount of the polypeptide of claim 3.
11. A method of claim 10, wherein the bacterial infection being treated or prevented is a streptococcal infection selected from the group consisting of group A, E, C, *S. uberis*, and *S. equi*.
12. A pharmaceutical composition for use in preventing or treating a bacterial infection, comprising an effective amount of the isolated polypeptides of claim 5 and a pharmaceutically acceptable carrier.
13. The pharmaceutical composition of claim 12, further comprising the isolated polypeptide of claim 6.
14. A method for preventing or treating a bacterial infection, comprising administering the pharmaceutical composition of claim 12 to a subject in need of such therapy.
15. A method for preventing or treating a bacterial infection, comprising administering the pharmaceutical composition of claim 13 to a subject in need of such therapy.
16. A purified antibody to a streptococcal PlyC multimer, or a subunit or fragment thereof, wherein the PlyC multimer, subunits and fragments are selected from the group consisting of the PlyC heavy chain or the PlyC light chain, and combinations thereof.
17. The antibody of claim 16, wherein said antibody binds to the polypeptide comprising the amino acid sequence set out in SEQ ID NO: 9.
18. The antibody of claim 16, wherein said antibody binds to the polypeptide comprising the amino acid sequence set out in SEQ ID NO: 11.

19. The antibody of claim 16, wherein said antibody binds to the polypeptide comprising the amino acid sequence set out in SEQ ID NO: 10.

20. An antibody which recognizes and binds to the proteins of any of SEQ ID NOs. 9, 10 or 11, wherein the antibody is a monoclonal antibody, a polyclonal antibody, a chimeric antibody, a humanized antibody, a single chain antibody or fragments thereto.

21. An immortal cell line that produces a monoclonal antibody according to claim 20.

22. The antibody of claim 16 labeled with a detectable label.

23. The antibody of claim 22, wherein the label is selected from the group consisting of an enzyme, a chemical or protein which fluoresces, and a radioactive element.

24. A method for diagnosing a pathogenic streptococcal infection, comprising:

- a) collecting a patient sample suspected of harboring a streptococcus;
- b) contacting the sample with a fluoresceinated PlyC multimer; and
- c) measuring the amount of fluoresceinated multimer bound to the sample, wherein the detection of binding indicates the presence of streptococci in the sample.

25. A method for detecting the presence of streptococci in a sample, comprising:

- a) collecting a patient sample suspected of harboring a streptococcus;
- b) incubating the sample with the PlyC multimer;
- c) collecting the cell lysate;
- d) incubating the cell lysate with luciferin-luciferase; and
- e) measuring the amount of light produced, wherein an increase in the amount of light produced is indicative of the presence of streptococci in the sample.

26. A method for detecting the presence of streptococci in a sample, comprising:

- a) collecting a patient sample suspected of harboring a streptococcus;

b) incubating the sample in the presence of luciferin-luciferase and the PlyC multimer;
and

c) measuring the amount of light produced, wherein an increase in the amount of light produced is indicative of the presence of streptococci in the sample.

27. A method for detection of pathogenic streptococci in a sample, comprising:

- a) collecting a sample from a patient suspected of having a streptococcal infection;
- b) adding the PlyC multimer into the sample until lysis of bacteria is observed;
- c) isolating the DNA from the lysed bacteria;
- d) utilizing the isolated DNA for preparation of a probe which can be utilized for analysis and identification of the presence of streptococcus in a patient sample.

28. The use of a polypeptide of any of claims 3-7 for the preparation of a medicament for the treatment of a bacterial infection.

29. The use of a polypeptide according to claim 28, wherein the bacterial infection is a streptococcal infection selected from the group consisting of group A, E, C, *S. uberis*, and *S. equi*.

30. A composition comprising the polypeptides of any of claims 3-7 for use in decontaminating milking, dairy, and agricultural equipment from streptococci.